

PROCEEDINGS OF THE
ENTOMOLOGICAL SOCIETY OF WASHINGTON

VOL. 43

MAY, 1941

No. 5

NEW SPECIES OF PSEUDOCOCCIDAE.¹

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During the course of making a study of the coccid fauna of Maryland, and the identification of material sent to the University and occasional collecting trips in South Carolina, a number of forms have come to hand that are apparently undescribed. The five species described below as new belong to the family Pseudococcidae as defined by Morrison.² They were collected in Maryland and South Carolina during the past three or four years. The genera represented are: *Pseudantonina*, one species from South Carolina; *Pseudococcus*, two species, one from Maryland and one from South Carolina; and *Trionymus*, two species from Maryland.

The author is grateful to Dr. Harold Morrison of the Bureau of Entomology and Plant Quarantine for the privilege of studying material in the National Collection and for making helpful criticisms of the manuscript.

The clerid mentioned in this paper was identified by Dr. E. A. Chapin of the U. S. National Museum and the chalcids by Mr. A. B. Gahan of the Bureau of Entomology and Plant Quarantine.

Pseudantonina arundinariae, n. sp.

Adult female, in life, occurring between leaf sheaths of host, flattened on account of position, derm pink to reddish (dead specimens dark brown to black), dorsum nearly naked, powdery wax along margins, especially posterior part of abdomen; no definite ovisac formed, eggs pushed out behind and mixed with powdery wax.

Larvae, mounted, 0.7 mm. long and 0.22 mm. wide, sides parallel; antennae 6-segmented, with segment VI about as long as segments II, III, IV, and V, together, otherwise normal in appearance; legs stout, tibiae and tarsi about equal in length; beak rounded, about as long as wide at base, apparently 2-segmented; anal lobes not protruded, apical setae long, stout, one subapical

¹ Paper #540 Scientific Journal Series, Maryland Agricultural Experiment Station.

² Annals of the Ent. Soc. of America, Vol. 22, p. 33, 1929.

seta; only trilocular pores present, arranged as follows: a marginal series of 28 to 34, apparently always one on each margin of abdominal segments, those of head and thorax not so definitely arranged, a longitudinal row on sub-median areas of dorsal and ventral surfaces of abdomen, others on head and thoracic surfaces, but not in definite rows; abdominal setae arranged as follows: on dorsum, a marginal series, apparently one seta on each segment, and six other longitudinal rows, each with a seta on each segment except the apical, six similar rows on the venter; two pairs of small cerarian spines on the apical segment with one associated seta and one trilocular pore; anal ring terminal or nearly so with six anal ring setae; apparently only posterior pair of dorsal ostioles present.

Adult female, mounted, from 2.5 to 5.2 mm. long and 1.7 to 2.5 mm. wide, slightly irregular in shape, segmental restrictions distinct, derm slightly sclerotized at margins, sides subparallel, tapering somewhat toward the well-rounded ends of the body; antennae at anterior margin of head, usually 6-segmented, normal in appearance for pseudococcine forms, sometimes teretological, with only 4 or 5 segments, first segment of normal antennae about twice as broad as second, second and third segments subequal in length, fourth usually shortest and narrowest, sixth segment twice as long as fifth, setae few, small; legs small, probably non-functional, but all the segments present; tibiae and tarsi vary considerably in length, tarsal digitules long, slender, hair-like, slightly knobbed at distal end, claw digitules stouter, exceeding claw, claws without denticle; derm about the hind coxae, or the hind coxae themselves expanded into a comma-shaped blister, thickly set with many minute simple pores about twice as deep as wide, leg proper attached near center of mesal margin of blister, leg setae few, small; tentorial structure rounded, longer than wide; beak small, rounded, wider at base than long, apparently 2-segmented; only apical pair of cerarii present, composed of two small short cerarian spines, no grouping of trilocular pores, and no definitely associated body setae; anal lobes, not at all indicated, apical setae small, about 120 microns long, without any definitely associated subapical setae, without a ventral thickening; trilocular pores arranged in broad, loose bands on abdomen, otherwise uniformly distributed, more on dorsal surface than on ventral; multilocular pores numerous, nearly all ventral, arranged in more or less definite patches, except on head, where scattered, and few in number, and on apical segment where numerous and uniformly distributed, extending on to dorsal margins; an anterior and posterior patch on ventral margins of other abdominal segments and indicated on thorax, patches extending on to dorsal margins of penultimate and antepenultimate segments; a median transverse band of patches on penultimate and antepenultimate segments; the number of pores in marginal patches decreasing from posterior toward anterior; tubular ducts apparently lacking, but some deep pores on ventral abdominal segments similar to those on hind coxae; body setae more numerous on ventral surface and longer than on dorsum; abdominal setae in definite loose transverse bands; setae on ventral surface of penultimate and antepenultimate segments anterior to transverse band of multilocular pore patches; setae on ventral margins of abdomen interspersed among anterior patch of multilocular pores, with only an occasional one in posterior patch; ventral setae of apical segment long, slender, uniformly distributed; anal ring

characteristic in shape (see Plate 10, fig. 3), about as broad as long, nearly terminal, not at all invaginated, anal ring setae about as long as apical setae, with usual inner and outer rings of pores; spiracles large, moderately sclerotized with several trilobular pores loosely grouped lateral to the opening; no ventral cicatrix; apparently only posterior pair of ostioles present.

Host.—*Arundinaria*, sp.

Locality.—Anderson, S. C., Aug. 18, 1939; August 25, 1939; March 1, 1940; and July 11, 1940.

Holotype, collected Aug. 18, 1939, deposited in the National Collection. Paratypes collected Aug. 18, 1939; Aug. 25, 1939; March 1, 1940; and July 11, 1940, in National Collection, Maryland Agricultural Experiment Station collection, Clemson College collection, and author's collection.

This species was described from a long series of specimens collected at the type locality. It seems to be definitely related to *Pseudantonina bambusae* Green and *P. giganticoxa* Lobdell, an American species. Judging from the published descriptions and illustrations, it differs from the *P. bambusae* in having the derm about the hind coxae only expanded, and poriferous, the anal ring not invaginated; more multilocular pores on the ventral surface of posterior part of body, and fewer on head; and in having a constant pair of apical cerarii that are not mentioned in Green's description of *P. bambusae*. It differs from *P. giganticoxa* Lobdell in being elongate instead of broad and oval, flattened instead of convex, one pair of dorsal ostioles instead of two pairs, many multilocular pores on dorsum instead of a few; deep, simple pores, instead of many small tubular ducts on body, the hind leg attached at side of poriferous expanded derm instead of at end, and in having a pair of constant apical cerarii.

Despite the fact that this species is well covered by the leaf sheaths of the host, a high percentage are parasitized by a species of *Pseudaphycus*. It is also attacked by the larvae of a small clerid beetle, *Isohydnocera curtipennis* (Newm.).

***Pseudococcus diodium*, n. sp.**

Living adult female small, oval and rather convex when fully mature, covered with powdery wax, derm pink to reddish, unrubbed specimens with short pencils of wax projecting from margins, ovisac formed of powdered wax mixed with long threads.

Adult female, mounted on slide, from 1.6 to 1.9 mm. long and 1.1 to 1.3 mm. wide; segmentation of abdomen fairly well indicated, derm membranous, eyes rather prominent; antennae 6 or 7 segmented, normal in appearance, more specimens 6-segmented than 7-segmented, some showing incomplete fusion of segments III and IV; segments III and IV about equal in length in 7-segmented specimens, terminal segment longest, fifth segment shortest, setae numerous, quite stout; leg normal in appearance, rather stout, claw digitules small, clubbed, only slightly exceeding claw, tarsal digitules small, slender, slightly clubbed,

scarcely reaching tip of claw, some specimens with clear pores on tibia and femur, setae numerous and stout; beak almost as long as tentorial structure, conical, distinctly 2-segmented; 17 pairs of cerarii, first three pairs on head with 3 or 4 cerarian spines, small, acutely pointed; other cerarii with only two cerarian spines, size of cerarian spines increasing in size from anterior to posterior, cerarii with two to four accessory setae, trilocular pores definitely grouped about each cerarius, usually separated by less than their diameter, number about each cerarius, varying from about 30 at the apical pair to 15 at the head cerarii; anal lobes definitely protruded, ventral surface with a large pear-shaped thickening, apical setae slightly shorter than anal ring setae, but stouter, 2 or 3 subapical setae; multilocular pores few, about 20, grouped around genital opening, not occurring elsewhere on the body; trilocular pores numerous, those on abdomen principally in segmental bands, otherwise evenly distributed over body; tubular ducts of a single type occurring only on ventral surface of posterior segments of abdomen, rather large, one-third longer than wide, a group at the margins of each of the four posterior segments, a few along the median portions of these segments; body setae not numerous, rather small, those on abdomen arranged principally in segmental rows, those on head and thorax evenly distributed, ventral setae somewhat stouter and longer than dorsal; two pairs of large, prominent dorsal ostioles with some grouping of trilocular pores; anal ring normal in appearance, with usual inner and outer rings of pores, six anal ring setae somewhat longer than the apical setae; without ventral cicatrix.

Hosts.—*Diodia teres* and false foxglove, *Gerardia (Aureolaria) laevigata*.

Locality.—Anderson, S. C., August 14, 1939, on roots of *Diodia teres*. This species was found very common on *Diodia teres*, a common annual weed, growing at margins of cultivated fields and on terraces. It was also collected August 28, 1939, on the roots of *Gerardia (Aureolaria) laevigata* growing in barren woods.

Holotype collected August 14, 1939, at Anderson, S. C., on *Diodia teres* deposited in the National Collection, numerous paratypes collected August 14, 1939, and August 28, 1939, on *Gerardia (Aureolaria) laevigata* in National Collection, Maryland Agricultural Experiment Station collection, Clemson College collection, and the author's collection.

This species is apparently closely related to a form Cockerell described as *Ripersia aurantia*, which really belongs in the genus *Pseudococcus*. It differs from that species principally in being smaller, in having more than two cerarian setae in the three anterior pairs of cerarii, fewer trilocular pores grouped about the cerarii, and the ventral thickening of anal lobes much larger.

***Pseudococcus junceus*, n. sp.**

Living adult female small, lightly covered with powdered wax, derm pinkish, short tassels of wax along posterior abdominal segments on unrubbed specimens, no definite ovisac formed, the eggs deposited beneath posterior tip of abdomen.

Adult female mounted, small, elongate oval, fully matured specimens somewhat convex, posterior end truncate in appearance, length from 1.01 to 1.51 mm., average length of several specimens 1.2 mm., width from 0.63 to 0.99 mm., average width of several specimens 0.77, anal lobes slightly protruded, abdominal segmentation rather distinct with some indication of sclerotization of coriae; eye spots large, tuberculate; spiracles large; antennae usually 7-segmented, occasionally segments III and IV partially or completely fused, rather short, otherwise normal in appearance; beak slightly more than half as long as tentorial structure, definitely 2-segmented, about as wide at base as long; legs normal in appearance, claw digitules small, delicate, slightly exceeding claw, tarsal digitules slender, short, not reaching tip of claw, hind coxae with a varying number of rather large clear pores; only 6 to 8 pairs of cerarii recognizable, cerarian spines gradually decreasing in size and increasing in length and distance apart from the apical pair toward the anterior until they can not be differentiated from body setae, the slight grouping of trilocular pores usually not evident beyond the sixth pair anterior to apical pair, all cerarii with two small, acute cerarian spines, 2 or 3 accessory setae in apical pair, others without; anal lobes slightly indicated, without ventral thickening, apical setae nearly twice as long as anal ring setae, stout; multilocular pores, few, about 40, all on ventral surface, most of them grouped around genital opening, a few on median portion of the two segments anterior to this opening; trilocular pores numerous, those on abdomen in segmental bands, evenly distributed on remainder of body; tubular ducts of one type, large, all on the ventral surface of the posterior 4 or 5 segments of abdomen, a group on each margin and a few on the median section of these segments; body setae not numerous, except on head area, in segmental bands on abdomen, evenly distributed on remainder of body, those of ventral surface slightly longer; two pairs large, prominent dorsal ostioles with some grouping of trilocular pores; anal ring normal in appearance with the usual inner and outer bands of pores and six anal ring setae; without ventral cicatrix.

Host.—Roots of *Juncus tenuis*

Locality.—College Park, Md., June 26, 1938; October 19, 1938; March 17, 1939; and June 26, 1939.

Holotype, collected June 26, 1938, deposited in the National Collection; numerous paratypes, collected on above dates, in National Collection, Maryland Agricultural Experiment Station collection and the author's collection.

This species departs quite widely from the typical pseudococcine form and its relationship to other forms is rather indefinite. It has been collected in one restricted area only, in all cases on *Juncus tenuis*, despite examinations in several areas, and several different species of *Juncus*.

***Trionymus caricis*, n. sp.**

Adult female, in life, long, narrow, egg laying individuals from 2 to 3 mm. in length, between leaf sheaths of host; an ovisac formed, of indefinite character on account of position on host plant, usually long, narrow, flat; body of female pinkish to reddish in color, lightly dusted over with powdered wax.

Adult female mounted, length from 2.3 to 3.2 mm., width 0.7 to 1.2 mm., sides nearly parallel, ends of body well rounded, segmental restrictions scarcely indicated; antennae small, normally 7-segmented, some 6-segmented, and some specimens with segments III and IV partially fused, average length of segments in microns about as follows: I, 32; II, 29; III, 19; IV, 22; V, 22; VI, 23; VII, 64; 6-segmented antennae have segment III about 38 microns long; legs rather small, slender, hind coxae with pores at base, varying from large to small in size; claws slender, curved, claw digitules stout, exceeding claw in length, tarsal digitules slender, exceeding claw, femur and tibia subequal in length, tarsus about one-third shorter than tibia; tentorial structure rounded, somewhat longer than wide; beak definitely 2-segmented, slightly longer than wide at base; only apical pair of cerarii definitely developed, with two small slender acute cerarian spines, a small group of trilocular pores separated from each other by two or three times their diameter, and a group of 4 or 5 accessory setae, anteapical pair of cerarii sometimes indicated by a single cerarian spine-like seta; anal lobes little if at all indicated, without a ventral thickening, apical setae somewhat longer and stouter than anal ring setae, several subapical setae; trilocular pores not numerous, in loose segmentally arranged bands on abdomen, uniformly distributed over remainder of body; multilocular disc pores numerous, nearly all on ventral surface, some on dorsal margins, and dorsum of posterior abdominal segments, ventral pores distributed as follows: uniformly over posterior segment, in loose anterior and posterior segmental bands on the three or four segments anterior to the apical, remainder of abdominal segments usually with only a posterior band; a few scattered over ventral surface of head and thorax; tubular ducts of two kinds, small, and very small, the smaller ones about half the diameter of the larger ones, and somewhat shorter, larger form more numerous, distributed as follows: on abdomen larger ducts principally near margins, some in a transverse row on each segment, smaller ducts few in number, scattered on segments, body types few and scattered on surfaces of head and thorax; body setae not numerous, ventral ones longer and stouter, in segmental bands on abdomen between bands of multilocular disc pores; two pairs of dorsal ostioles; ventral cicatrix circular to transverse oval between third and fourth abdominal segments; anal ring not unusual.

Host.—*Carex tribuloides* Wahl.

Locality.—Bowie, Md., at Priests Bridge, collected Aug 4, 1940.

Holotype, collected Aug. 4, 1940, in the National Collection; paratypes collected same place and date, in National Collection, Maryland Agricultural Experiment Station collection and author's collection.

This species was collected on *C. tribuloides* growing on the banks of the Patuxent River. All specimens observed were beneath the leaf sheaths. Other species of *Carex* and *Cyperus* growing near were examined but no specimens were found. Its relationship to other forms of the genus *Trionymus* is too indefinite to warrant a statement. The double row of multilocular pores on the dorsum of the posterior abdominal segment

is quite striking, as is also the very narrow, elongate form. A few specimens of the chalcid *Xanthoencyrtus* sp. were reared from this species.

***Trionymus cladestinis*, n. sp.**

Adult female collected while ovipositing deep in the crown of *Panicum* spp., some specimens on roots; large, dense, doughy masses of wax completely covering one or two, or more specimens served as ovisac; derm of female pinkish; elongate.

Adult female mounted, elongate with well-rounded ends, sides parallel; average length 3.5 mm. and average width 1.9 mm.; derm membranous; antennae usually 7-segmented, normal in appearance, occasionally segments III and IV partially fused; segment lengths in microns about as follows: I, 61; II, 50; III, 30; IV, 39; V, 23; VI, 29; VII, 84; thus segment VII is much the longest; legs normal in appearance, long and rather slender, tarsi about $2/5$ as long as tibiae; claws stout, curved, claw digitules exceeding claw, tarsal digitules long, slender; hind coxae with clear pores at base, tibiae and tarsi sometimes with small clear pores, two spine-like setae at apex of tibia; with only apical pair of cerarii present, no modification of setae nor grouping of pores to indicate others, the two cerarian spines rather small, sharp, 25 to 30 trilocular pores grouped about cerarian spines, and 3 to 5 apparently associated setae; anal lobes not at all indicated, without ventral thickening, apical setae long and stout, one or two subapical setae; trilocular pores few, some suggestion of loose segmental arrangement on abdomen, evenly scattered on head and thorax, somewhat more numerous on ventral surface; multilocular disc pores numerous, distinct bands on dorsal and ventral surfaces of all of body except head where scattered, more numerous on ventral surface; two kinds of tubular ducts, small and very small, the smaller ones about half the diameter of the larger ones, but only slightly shorter; both kinds on both surfaces, larger ones more numerous, arranged as follows: smaller ducts usually anterior to multilocular disc pore bands, larger ones interspersed among multilocular disc pore bands, more numerous at margins of abdomen, both types distributed on both surfaces of head, more at margins; body setae few, arranged in transverse bands anterior to multilocular disc pore bands on abdomen, ventral setae longer than dorsal, conspicuously so on head; spiracles rather large with a group of trilocular pores about opening, more numerous at posterior pair; anal ring heavily sclerotized, with usual inner and outer bands of pores, six anal ring setae, about 115 microns long; ventral cicatrix small, oval, apparently between third and fourth abdominal segments; two pairs of dorsal ostioles with slight grouping of trilocular pores.

Hosts.—*Panicum cladistinum* and *Panicum* sp.

Locality.—Ashton, Md., October 12, 1939, and College Park, Md., Oct. 14, 1939.

Holotype collected at Ashton, Md., October 12, 1939, in the National Collection; paratypes collected at Ashton, Md., October 12, 1939, and College Park, Md., October 14, 1939, in National Collection, Maryland Agricultural Experiment Station collection, and in the author's collection.

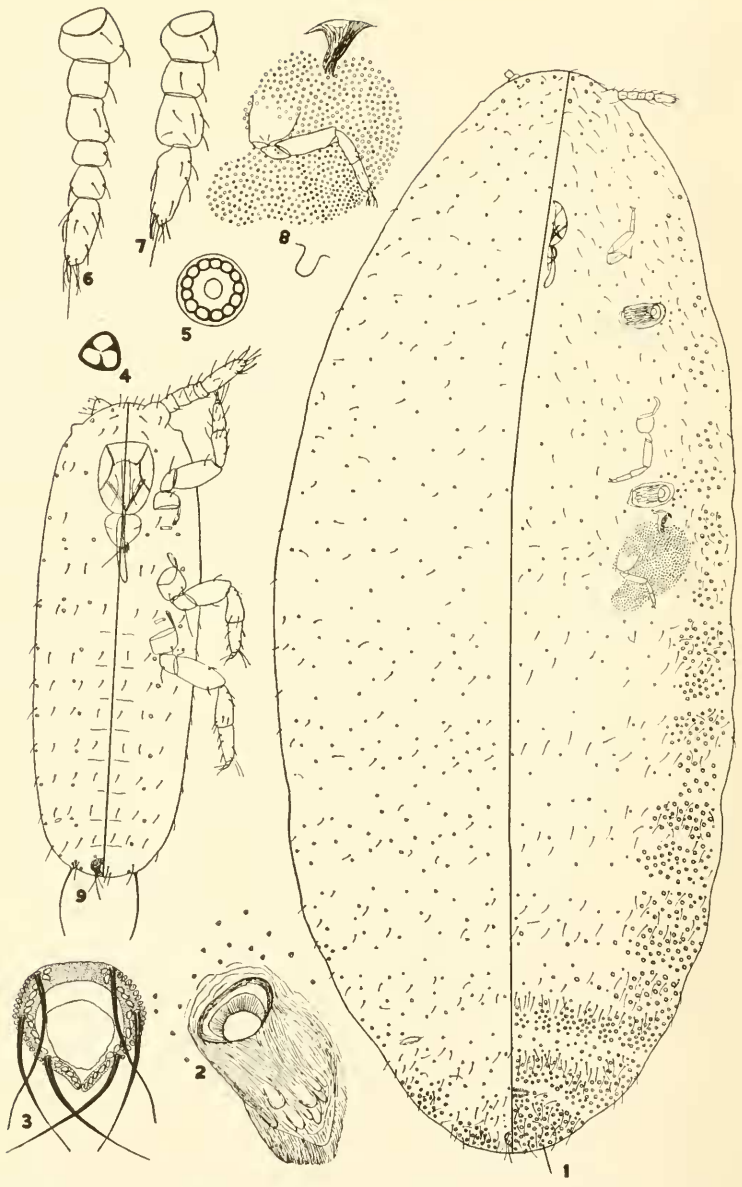


PLATE 10. *Pseudantonina arundinariae*, adult female: 1, details of dorsal and ventral surfaces X 40; 2, posterior spiracle, X 240; 3, anal ring, X 330; 4, trilocular pore, X 1400; 5, multilocular pore, X 1400; 6, 6-segmented antenna, X 100; 7, 4-segmented antenna, X 100; 8, hind leg, X 80; and pore greatly enlarged; larva, 9, X 80.

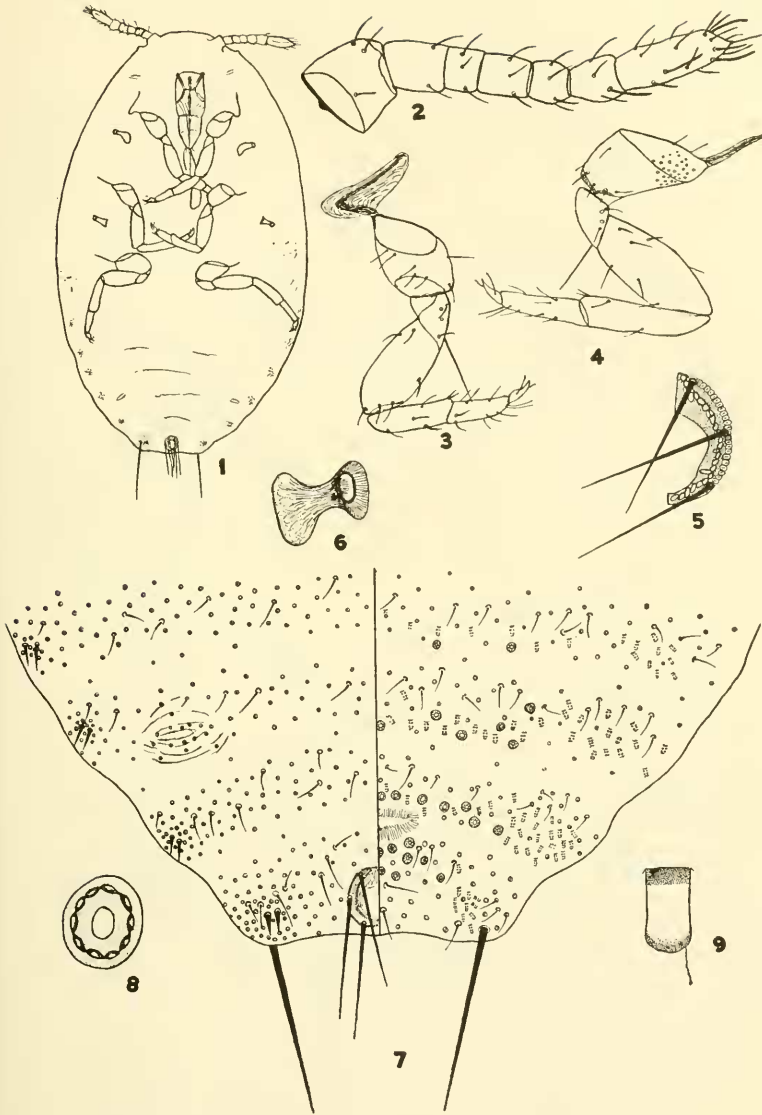


PLATE 11. *Pseudococcus junceus*, adult female: 1, outline of body, X 45; 2, antenna, X 220; 3, mesothoracic leg, X 140; 4, hind leg, X 140; 5, anal ring, X 120; 6, posterior spiracle, X 300; 7, apex of abdomen, X 160; 8, multilocular pore, X 2900.

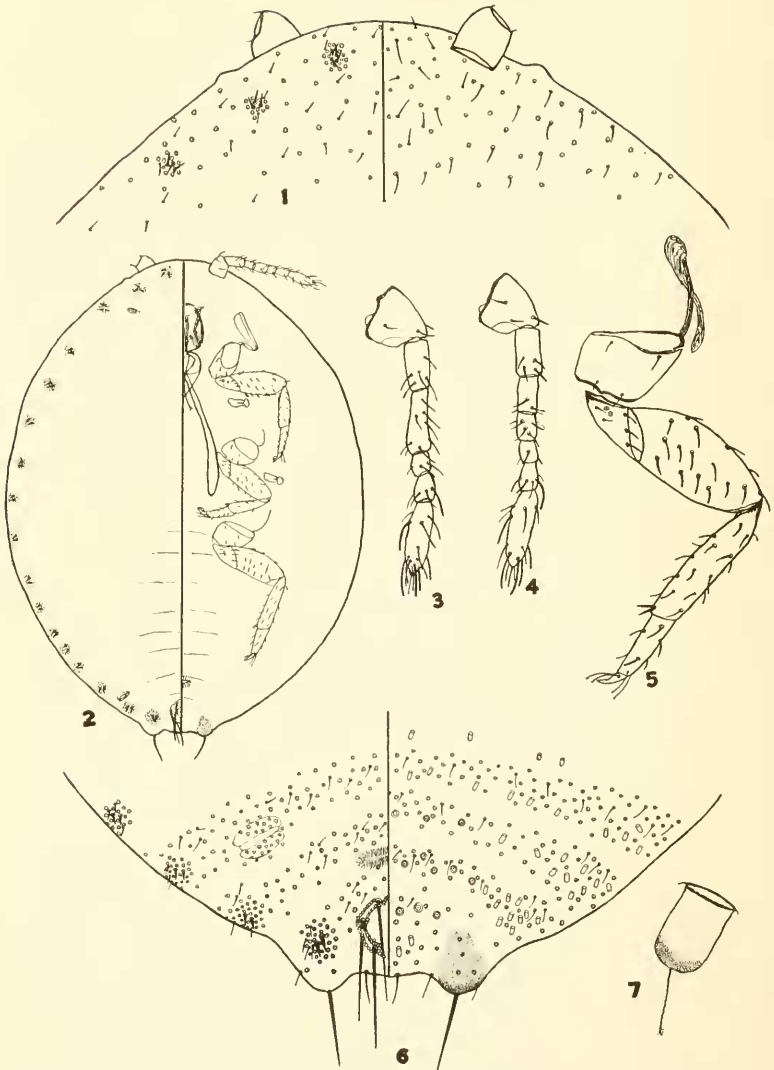


PLATE 12. *Pseudococcus diodum*, adult female: 1, apex of head, X 155; 2, outline of body, X 36; 3, 6-segmented antenna, X 130; 4, 7-segmented antenna, X 130; 5, hind leg, X 130; 6, apex of abdomen X 85; 7, tubular duct, X 1100.

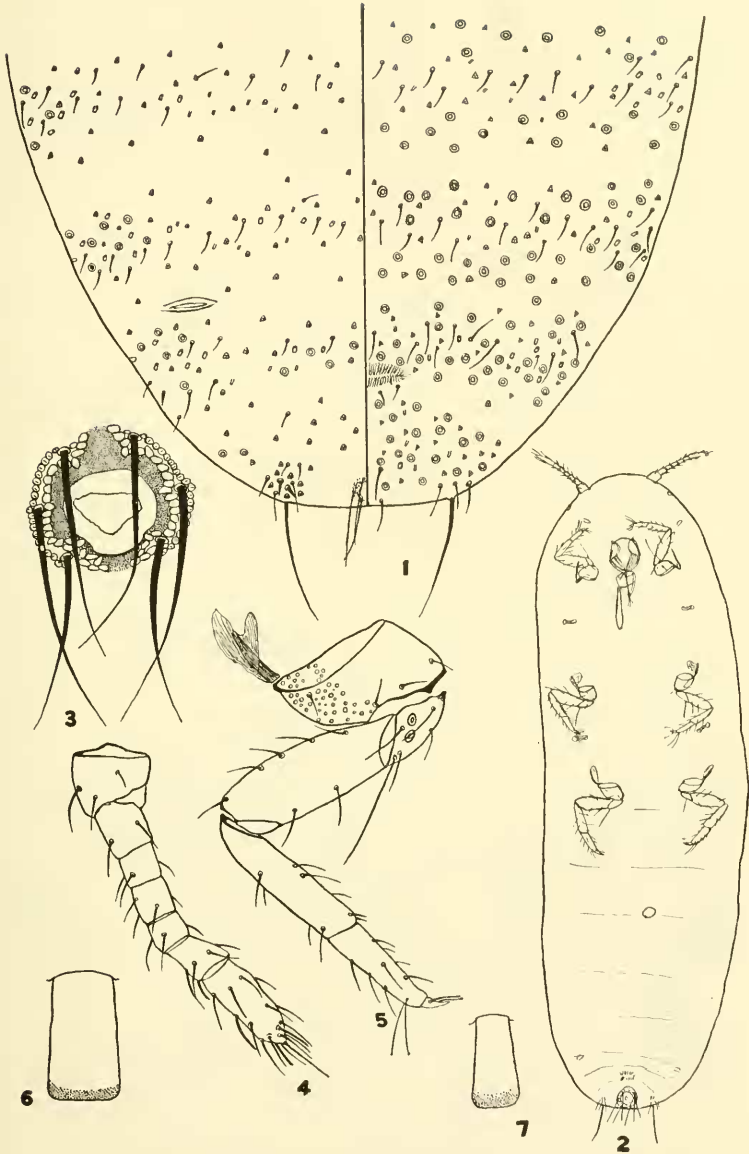


PLATE 13. *Trionymus caricis*, adult female: 1, apex of abdomen, X 77; 2, outline of body, X 37; 3, anal ring, X 220; 4, antenna, X 220; 5, hind leg, X 220; 6, tubular duct, X 2600; 7, tubular duct, X 2600.

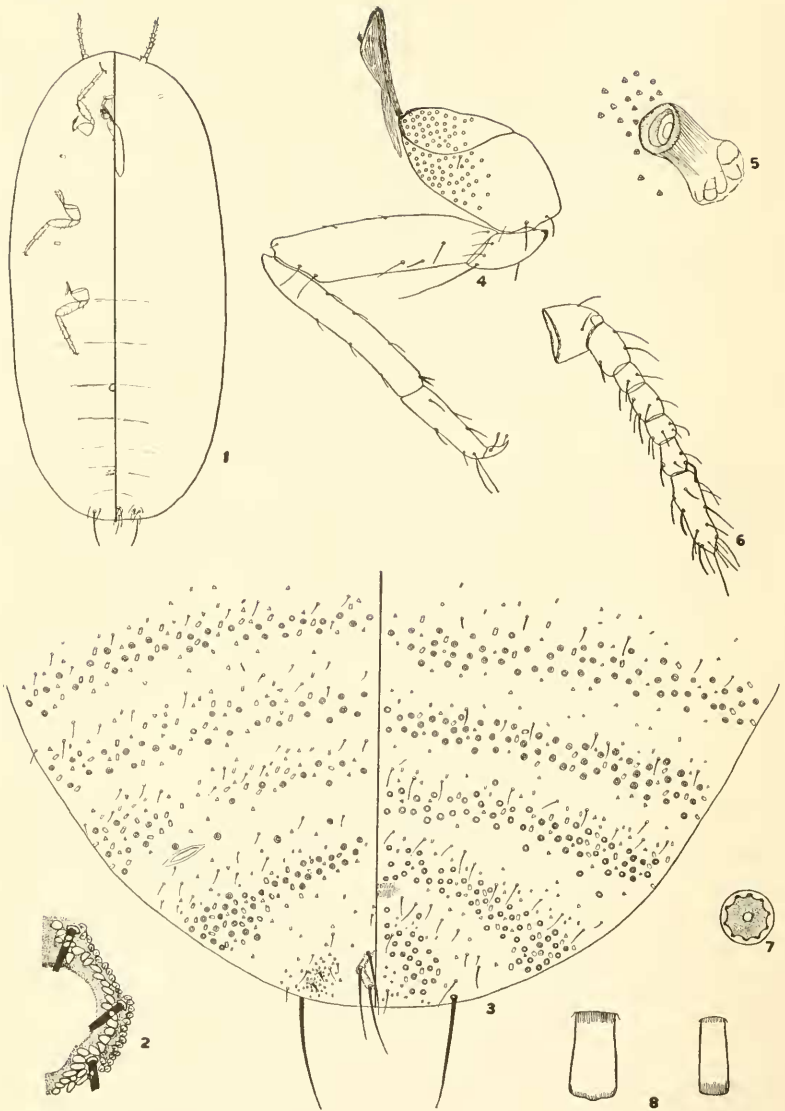


PLATE 14. *Trionymus cladestinis*, adult female: 1, outline of body, X 20; 2, anal ring, X 345; 3, apex of abdomen, X 85; 4, hind leg, X 145; 5, posterior spiracle X 220; 6, antenna, X 145; 7, multilocular disc pore, X 950; tubular ducts, X 1900.

This species seems to be most closely related to *Trionymus insularis* Ehn., from which it differs principally in the following respects: the legs are longer and more slender, and in the number and arrangement of the tubular ducts on the abdomen. In *T. insularis* they are very numerous and in crowded transverse bands.

THE GENUS ZONOTHRIPS IN NORTH AMERICA (THYSANOPTERA).

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The genus *Zonothrips* Priesner was established in 1926¹ for a new species from Java. The discovery of this, the second species of the genus, in the northeastern part of the United States is, therefore, of great interest. In habitus the species of this genus greatly resemble many of the species of *Sericothrips* but not those of the group to which the genotype belongs. In *Zonothrips* there are only seven segments in the antenna, the seventh and eighth segments being so completely fused that there remains not even a trace of a suture between them, and I know of no species of *Sericothrips* showing even a tendency to such fusion.

Zonothrips osmundae, new species.

Female.—Length 1.1 mm. Orange yellow, head slightly paler, lateral margins of prothorax broadly subhyaline; no dark pronotal saddle-shaped blotch; mesonotum tinged with brownish, abdomen with brown marks; antennae with basal segments light yellow, intermediate ones darkened apically, apical segments dark brown; fore wings subhyaline, with scale and two cross bands of gray brown; legs yellow, slightly tinged with orange brown and contrasting with body color; combs complete on all intermediate segments; all body bristles, except light brown ones on apical abdominal segments, only slightly tinged with yellowish.

Head wider than long; eyes hardly bulging, sparsely pilose, and with large facets; cheeks almost straight, slightly converging caudad; occipital carina not darkened, very faint medially; lateral ocelli remote from eyes, ocellar crescents maroon; ocellar area elevated, brownish; frontal costa roundly, deeply emarginate; anteoellar bristles, interocellars, and inner postoculars subequal in length, colorless and almost indiscernible; anteoellar region with transverse lines postocellar and occipital regions faintly, minutely roughened; antennal segments I whitish, II and III yellow lightly tinged with orange, with III lighter, paler

¹ Treubia, vol. 8, Supplement, pp. 50, 51, 260.